Potomac Economics, Ltd.
701 City Center Drive
Carmel, IN 46032

POTOMAC ECONOMICS

Telephone: 317-249-5721
Facsimile: 317-249-5943

February 19, 2010

Members of Service List (EC05-110)

PAC-E-05-08

Re: Quarterly Market Monitoring Report

Dear Service List Member:

Please find attached the public (redacted) version of the Fourth Quarter 2009 Quarterly Market Monitoring Report for PacifiCorp.

Regards,

Michael W. Chiasson, P.E.
Vice President

Enclosure

POTOMAC ECONOMICS

QUARTERLY MARKET MONITORING REPORT ON PACIFICORP

Fourth Quarter of 2009

Issued by:

Potomac Economics, Ltd.
Independent Market Monitor

CONFIDENTIAL MATERIAL REDACTED

Table of Contents

List of Figures

I. OVERVIEW

In connection with MidAmerican Energy Holdings Company's ("MEHC's") acquisition of PacifiCorp ("PAC" or the "Company") in Federal Energy Regulatory Commission ("Commission") Docket No. EC05-110-000, the Commission accepted market monitoring plans for PAC and MidAmerican Energy Company ("MEC") and Potomac Economics was retained as the independent market monitor for both companies. The plans established that separate quarterly reports be produced for each company. This is the market monitoring report for the fourth quarter of 2009 for PAC.

The market monitoring plan for PAC is designed to detect any anticompetitive conduct from operation of the company's transmission system, including any transmission effects from the company's generation dispatch. As stated in the plan:

> The Market Monitor shall provide independent and impartial monitoring and reporting on: (i) generation dispatch of PacifiCorp, and scheduled loadings on constrained transmission facilities; (ii) details on binding transmission constraints, such as transmission refusals, or other relevant information; (iii) operating guides and other procedures designed to relieve transmission constraints and the effectiveness of these guides or procedures in relieving constraints; (iv) information concerning the volume of transactions and prices charged by PacifiCorp in the electricity markets affected by these companies before and after the companies implement redispatch or other congestion management actions; (v) PacifiCorp's calculation of Available Transmission Capability ("ATC") and Total Transfer Capability ("TTC") over transmission lines owned or controlled, in whole or in part, by PacifiCorp; and (vi) plans for construction by PacifiCorp of expansions to its transmission facilities.

To execute the monitoring plan, Potomac Economics routinely receives data from PAC that allows us to monitor generation dispatch, transmission system congestion, and the Company's operational and commercial activity during periods of congestion. We also collect certain key data ourselves, including OASIS data and market pricing data.

The purpose of this report is to provide the results of our monitoring activities and significant events on the PAC system[1] during the fourth quarter of 2009.

[1] As specified in the monitoring plan, a draft of the findings has been submitted to PAC prior to submission to the Commission. PAC had no substantive comments.

A. Market Monitoring

Potomac Economics performs the market monitoring function on a regular basis, as well as performing periodic reviews and special investigations. Our primary market monitoring is conducted by way of regular analysis of market data relating to transmission outages, congestion, and transmission access. This involves data on transmission outages, transmission reservation requests, Available Transfer Capability ("ATC"), and curtailments or other actions taken by PAC to manage congestion. Analyses of these data aid in detecting congestion and determining whether market participants have full access to transmission service.

In addition to the regular monitoring of outages and reservations, we also remain alert to other significant events, such as price spikes, major generation outages, and extreme weather events that could adversely affect transmission system capability and give rise to the opportunity for anticompetitive conduct.

Our periodic review of market conditions and operations is based on operating data PAC provides us, as well as other data that we collect on a routine basis. Our review consists of four parts. First, we evaluate regional prices and transactions to provide an assessment of overall market conditions. Second, we summarize transmission congestion in order to detect potential competitive problems. Congestion is identified by schedule curtailments on the PAC transmission system. Third, we evaluate the disposition of transmission service requests to analyze transmission access and to detect whether there are circumstances on the PAC system that require closer analysis. Finally, to monitor for anticompetitive conduct, we examine periods of congestion and evaluate whether PAC operating activities raise concerns that PAC appears to be behaving anti-competitively. The operating activities that we evaluate are wholesale purchases and sales, generation dispatch, transmission outages, and the curtailment and reduction of schedules.

In addition to our periodic reviews, we may from time-to-time be asked to or deem it necessary to undertake a special investigation in response to specific circumstances or events. No such events occurred this quarter.

B. Summary of Quarterly Report

1. Wholesale Prices and Transactions

Prices: We evaluate regional wholesale electricity prices to provide an overview of general market conditions. Over the course of the quarter, Eastern and Western control area electricity prices remained correlated with load and natural gas prices. There was a pronounced price spike on December 9. Therefore, we focused particular attention on that day throughout the report to detect whether it may have been related to any anti-competitive behavior.

Sales and Purchases: PAC engages in wholesale purchases and sales of power on both a short-term and long-term basis. [redacted] We analyze sales and purchases in Section V.A.

2. Transmission Congestion

We studied congestion on the PAC system by examining schedule curtailments and reductions. In the period of study, PAC implemented 481 curtailments and schedule reductions totaling 30,636 MWh across 22 paths. We utilize curtailments as an indication of congestion. In addition, we analyze the accuracy of curtailments because unjustified curtailments can be used to foreclose competition.

3. Transmission Access

We evaluate the patterns of transmission requests and their disposition to determine whether market participants have had difficulty accessing the PAC transmission network. If requests for transmission service are frequently denied, this may indicate an attempt to exercise local market power. The volume of approved requests was higher than the levels observed in the fourth quarter of 2008 and higher than the third quarter of 2009. The volume of refusals was higher than the preceding quarter and higher compared to the same quarter of the prior year. We see no evidence that these refusals were not legitimate. Our review of the disposition of transmission requests does not indicate anticompetitive behavior.

4. Potential Anticompetitive Conduct

Wholesale Sales and Purchases: We examined the transactions that PAC executed during the period of study. We focus on real-time transactions because these best represent the spot price of electricity and will most closely reflect power prices that might arise on the PAC system under conditions most conducive to market power. Under a hypothesis of market power, we would expect high sales prices or lower purchase prices during times when transmission congestion arises. Real-time daily average transaction prices ranged between $[redacted] MWh and $[redacted] MWh. We focused our evaluation of PAC's generation and transmission on days with congestion that may have benefited PAC's net sales position.

Dispatch: To further evaluate competitive issues, we examine PAC's generation dispatch to determine the extent to which congestion may be caused or exacerbated by uneconomic dispatch. Congestion can result naturally when PAC or any utility attempts to dispatch its units in a least-cost manner. Such congestion does not raise competitive concerns. If an unjustified departure from least-cost dispatch ("out-of-merit" dispatch) occurs, causing congestion, competitive concerns arise. Our investigation found that out-of-merit dispatch during the study period that had significant effects on transmission constraints was justified. Hence, this analysis did not reveal evidence of anticompetitive conduct.

Transmission Outages: We also evaluate PAC transmission security events and transmission outages in order to determine whether these events may have unduly caused congestion. We focused our analysis on seven outage events that were associated with curtailments. We investigated these events and found no evidence of anticompetitive conduct.

Transmission Operations: We analyze PAC curtailments to determine whether curtailments are being properly implemented. PAC manages congestion, prioritization of schedules, and low voltage events with schedule curtailments. We scrutinized 57 curtailments that were at least 75 MW above what we estimate to be justified by net schedules and TTC. We were able to fully justify 45 of these 57 curtailment deviations. Given that 481 curtailments were implemented over the quarter, we find that actions taken to manage the system were accurate. We do not find evidence of anticompetitive conduct. However, improvements are needed in the process of implementing changes to the list of active points of receipt and points of delivery. This is

evidenced by the fact that all twelve unjustified curtailment deviations were associated with software issues related to this process.

C. Complaints and Special Investigations

We have not been contacted by the Commission or other entities regarding PAC's market behavior. We also have not detected any conduct or market conditions that would warrant a special investigation. There were no complaints lodged against PAC regarding transmission access during the study period.

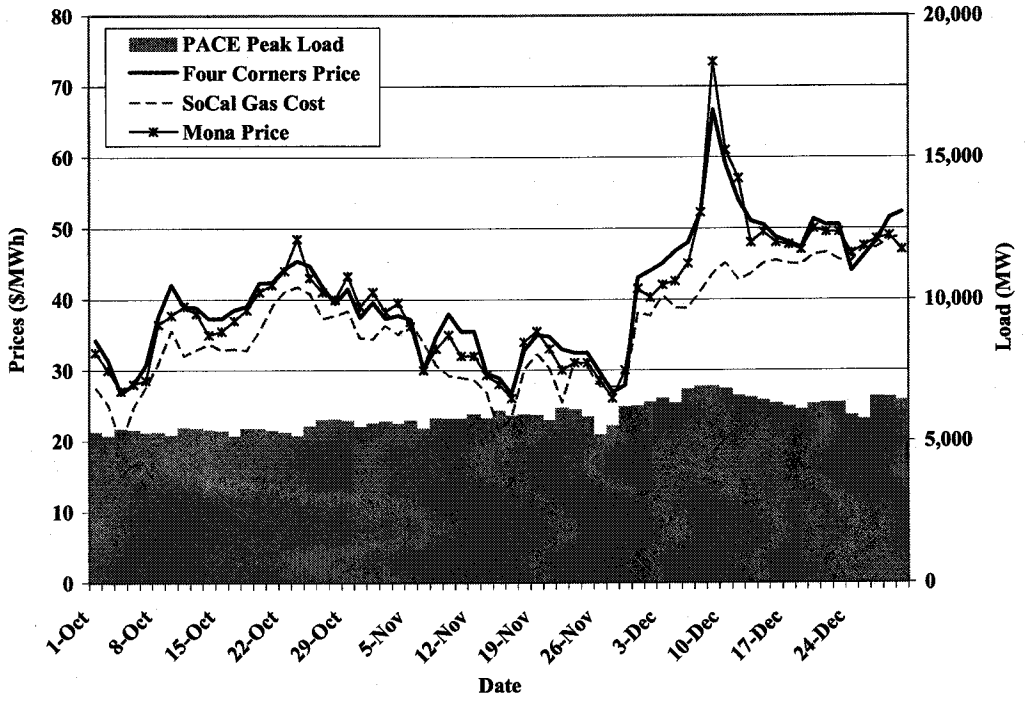
II. WHOLESALE PRICES AND TRANSACTIONS

A. Prices

We evaluate wholesale electricity prices in the PAC region in order to provide an overview of general market conditions. Examining price movements can provide insight into specific time periods that may merit further investigation, although they are not definitive indicators of the presence or absence of anticompetitive conduct.

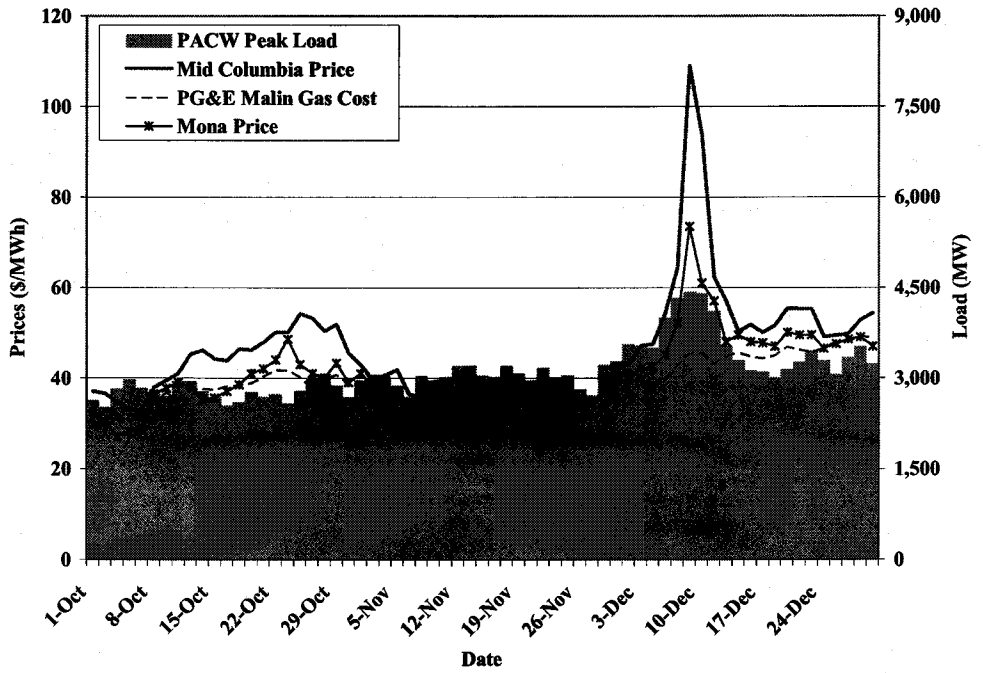
PAC is not part of a centralized wholesale market where spot prices are produced transparently in real-time. Wholesale trading in the areas where PAC operates is conducted under bilateral contracts. Because of its geographic expanse, we consider two sets of pricing points to represent the Western and Eastern portions of PAC's system. Figure 1 shows the bilateral contract prices for Four Corners and Mona (representing the East) and Figure 2 shows the bilateral contract prices for Mid Columbia and Mona[2] (representing the West).

Figure 1: East Wholesale Prices and Peak Load, Fourth Quarter of 2009



[2] Mona is a relatively illiquid and lightly traded market point in central Utah. It is included in both figures to provide a baseline for comparison between them.

Figure 2: West Wholesale Prices and Peak Load, Fourth Quarter of 2009



System load data is also shown because of the expected correlation with power prices. The Eastern control area load is shown on the East figure and the Western control area load is shown on the West figure. Natural gas prices are also shown because natural-gas-fired units are most often the marginal unit supplying the grid, and because fuel costs comprise the vast portion of a generating unit's costs. For the West analysis we use the daily price of natural gas deliveries at PG&E Malin (at the Northern California Border) translated to a power cost assuming an 8,000 btu/kWh heat rate. This number roughly corresponds to the fuel cost portion of the operating cost of a natural gas combined cycle power plant. For the East comparison, we use SoCal Border Gas (at the Southern California Border) price and apply the same power-cost conversion.

Prices for bilateral contract transactions are compiled and published by commercial pricing surveys. The bilateral pricing data shown in the figure above is published by Platts. The Mid Columbia pricing location includes a collection of hydroelectric units along the Columbia River in Oregon and Washington, and represents the value of electricity in the Pacific Northwest. This is a liquid point in PAC's Western control area. The Four Corners location is at the southern end of the PAC transmission system where New Mexico, Colorado, Arizona, and Utah meet. Prices at Four Corners represent the value of electricity in the Desert Southwest. This is the liquid point that is closest to PAC's Eastern control area.

Figure 1 and Figure 2 show that power prices at both Mid Columbia and Four Corners are generally correlated with fluctuations in natural gas prices and load, which is consistent with expectations in a properly functioning market. There was one price spike on December 9 in both the East and West regions, which was mainly caused by rising spot natural gas prices and unusually cold temperatures in the west region. The effect of the temperature on load can be seen in Figure 2 by the sharp load increase.

The next analysis compares the average Four Corners and Mid Columbia power prices for the period from October 2006 through December 2009 with average prices during the same period over the past three years. These results are shown together with the average Platts SoCal Border and PG&E Malin natural gas prices discussed above. As the figures show, electricity prices have generally been highly correlated with natural gas prices over longer timeframes.

Figure 3: East Trends in Monthly Electricity and Natural Gas Prices Fourth Quarter, 2006–2009

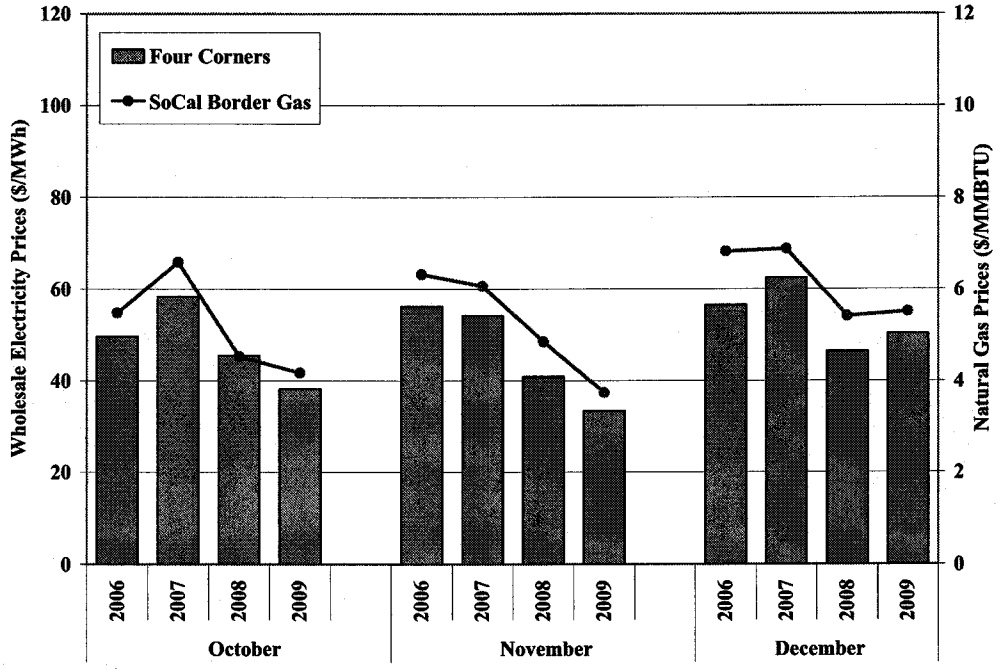
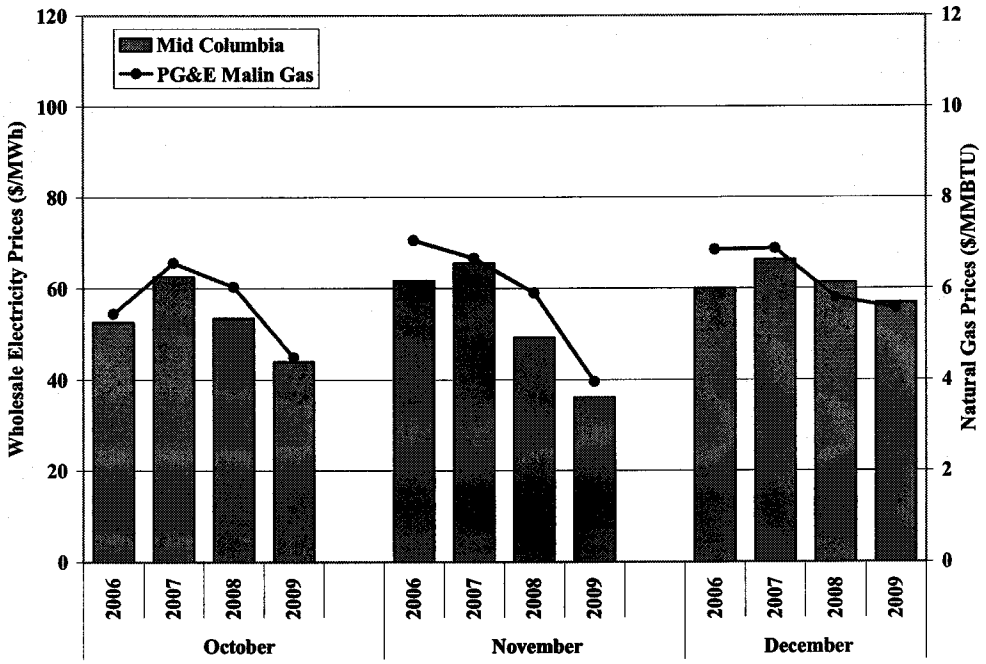


Figure 4: West Trends in Monthly Electricity and Natural Gas Prices Fourth Quarter, 2006–2009



Overall, our evaluation of wholesale electricity prices in the PAC region indicates a price spike on December 9. Throughout the report, we focus particular attention on that day to detect whether it may have been related to any anti-competitive behavior.

B. Sales and Purchases

PAC engages in wholesale purchases and sales of power, both firm and non-firm transactions. Figure 5 summarizes PAC's sales and purchases activity for trades that delivered during the fourth quarter of 2009. We consider only short-term trades because we are interested in transactions made by PAC where they could have benefited from any potential market abuse during this time period. Short-term transactions include all transactions that are less than one month in duration. Longer-term transactions generally occur at predetermined prices that would not be directly affected by transitory periods of congestion. Additionally, short-term transaction prices are good indicators of wholesale market conditions during periods of congestion.

Figure 5: Summary of PAC Sales and Purchases
Fourth Quarter of 2009

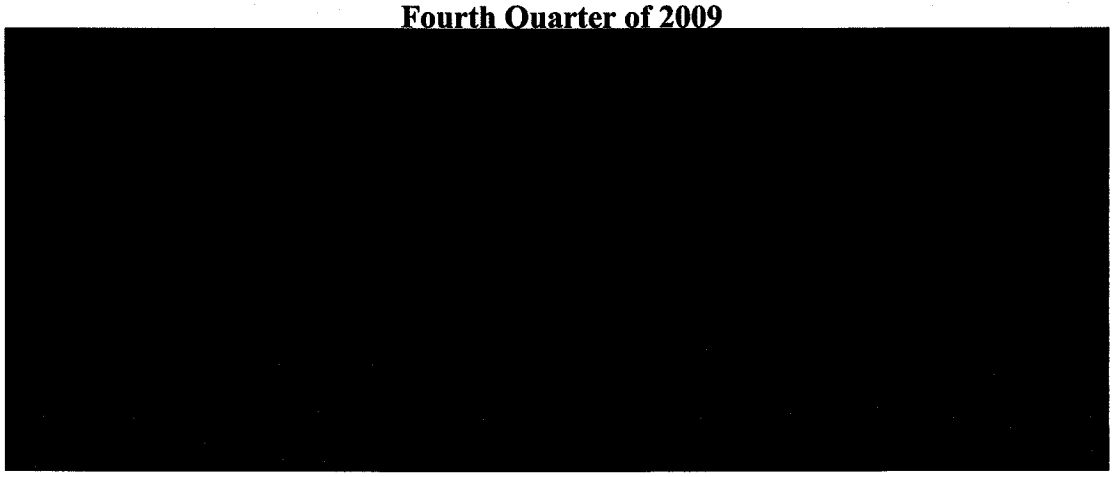


Figure 5 shows that PAC [redacted] we evaluate the prices of real-time transactions during congested periods in Section V.A to detect potential anticompetitive conduct.

III. TRANSMISSION CONGESTION

A. Overview

PAC is a member of the Western Electricity Coordinating Council (WECC). In WECC, regional congestion is primarily managed by ensuring that the scheduled flows do not exceed flow limits on specified paths.[3] However, because actual flows sometimes exceed scheduled flows due to loop flow (or parallel path flow), additional congestion management procedures are employed.

Power flows in the WECC follow a relatively predictable pattern. Most of the flows over the network occur on the high-voltage facilities that roughly correspond to the geographic perimeter of WECC. The transmission system in the interior of the WECC boundaries operates at a lower voltage and carries less power. The topology of the transmission network causes power to circulate around the perimeter of the system. Typically, power transfers from the Pacific Northwest are scheduled south to California. However, sometimes this north-to-south power flow results in unscheduled increases in flow around the perimeter of the WECC system in the clockwise direction, passing through the PAC system and then on to California from the west through Arizona.

The PAC system consists of two control areas: PACW in Northern California, Western and Central Oregon and Southeast Washington, and PACE, which is in Wyoming, Southeast Idaho, and Utah. PAC extends across a broad geographical area, having a presence in six states. It has 16,400 miles of transmission lines and approximately 10,700 MW of owned or controlled net generation capacity. PAC operates a significant portion of the transmission facilities that provide north-to-south flow along the eastern perimeter of WECC.[4] These flows pass through a key interface that is operated by PAC known as Path 20 (sometimes referred to as Path C). Path 20 was a "qualified path" in the north-to-south direction under the UFRPs used by WECC.[5]

---

3 This is in contrast to how congestion is managed in the Eastern Interconnect where congestion management generally is focused on actual flows on flowgates as opposed to scheduled flows on contract paths.

4 While north-to-south flow is common, patterns of schedules and generation dispatch sometimes cause south-to-north flow.

5 WECC uses UFRPs when actual flow exceeds scheduled flow on a "qualified path". There are a limited number of qualified paths identified based on certain criteria that include the path having a history of unscheduled flow. The UFRP consists of a series of nine steps that are intended to relieve the congestion through the operation of equipment and, ultimately, the curtailment of schedules.

However, effective September 15, 2008, the path was disqualified by the WECC operating committee.

In this section, we investigate congestion on the PAC system by examining curtailments and transmission service request refusals. We also examine plans for construction of expansions to transmission facilities and found cases where the planned expansions may reduce congestion in constrained areas. Nothing from our review of PAC's planned expansions raised competitive concerns.

B. Transmission Operating Procedures

During the period of study, PAC implemented 481 curtailments (including cases when curtailments were reversed) and schedule reductions totaling 30,636 MWh across 22 paths.

Curtailments can be initiated when one of four conditions occurs: (1) the path is overscheduled (due to conditions on the transmission system causing a reduction in TTC); (2) a schedule with a higher priority reservation displaces a schedule with a lower priority reservation; (3) a low-voltage constraint is binding; or (4) actual flows exceed the capability of the path. The accuracy of these curtailments and schedule reductions are evaluated in Section V.

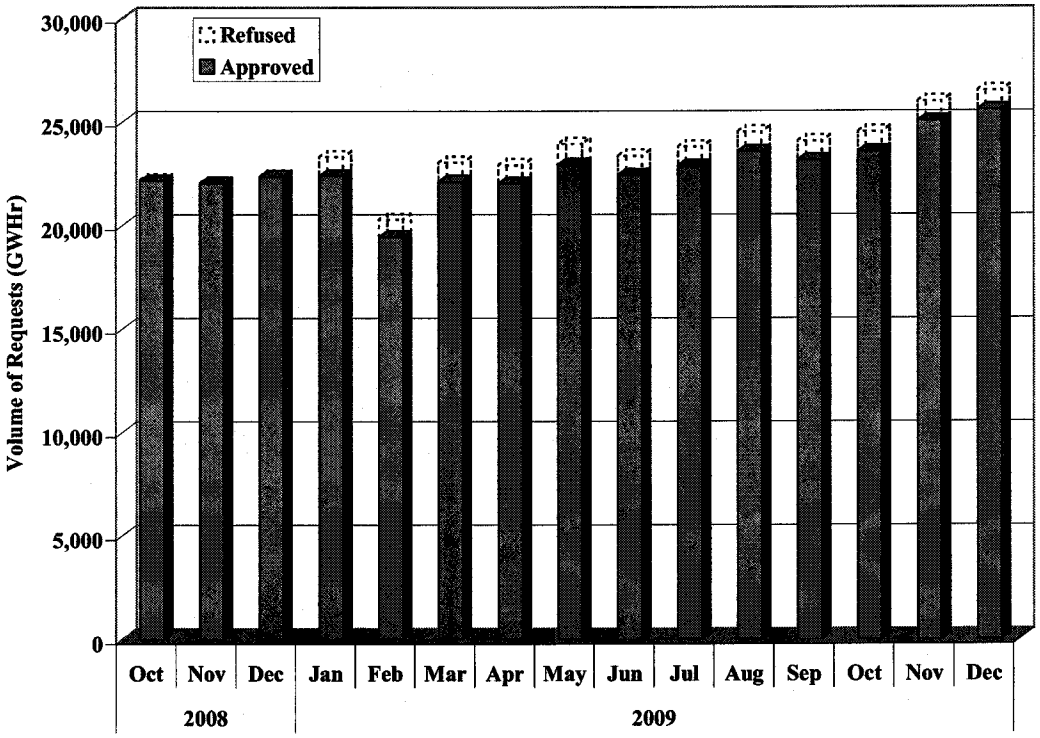
IV. TRANSMISSION ACCESS

A main component of the market monitoring function is to evaluate transmission availability on the PAC system. In this section, we evaluate access to the transmission network by analyzing the disposition of transmission requests. The patterns of transmission requests and their disposition are helpful in determining whether market participants have had difficulty accessing the PAC transmission network.

In order to make this evaluation, we calculate the volume of requested capacity that spanned the time period under study. For example, if a request was approved in January for service in June, we categorize that as an approval for June. Because requests vary in magnitude and duration, we assign a total monthly volume (GWh) associated with a request, which provides a common measure for all types of requests. Hence, a yearly request for 100 MW has rights for every hour of the month for which the request spans, just a like a monthly request. A request covering less than the entire month is assigned the hours between its start and stop time.

Figure 6 shows the breakdown of transmission service requests in each month from October 2008 through December 2009 and summarizes the disposition of the requests.

Figure 6: Disposition of Requests for Transmission Service on the PAC System October 2008 - December 2009



The figure shows that the total volume of approved requests during the fourth quarter of 2009 was higher than the fourth quarter of 2008 and higher than the third quarter of 2009. The volume of refused service requests during the quarter was slightly higher than the preceding quarter, averaging 2846 GWHr. Hence, the approval rates for the fourth quarter 2009 and the third quarter 2009 were comparable, averaging 96 percent. We reviewed the refusals and found no evidence that these refusals were not legitimate or that PAC had unreasonably restricted access to its transmission system.

To further evaluate the disposition of transmission requests, we compare the volume of transmission requests over the study period by increment of service to the requests from the corresponding period twelve months prior. This comparison is shown in Figure 7.

Figure 7: Disposition of Transmission by Duration of Service

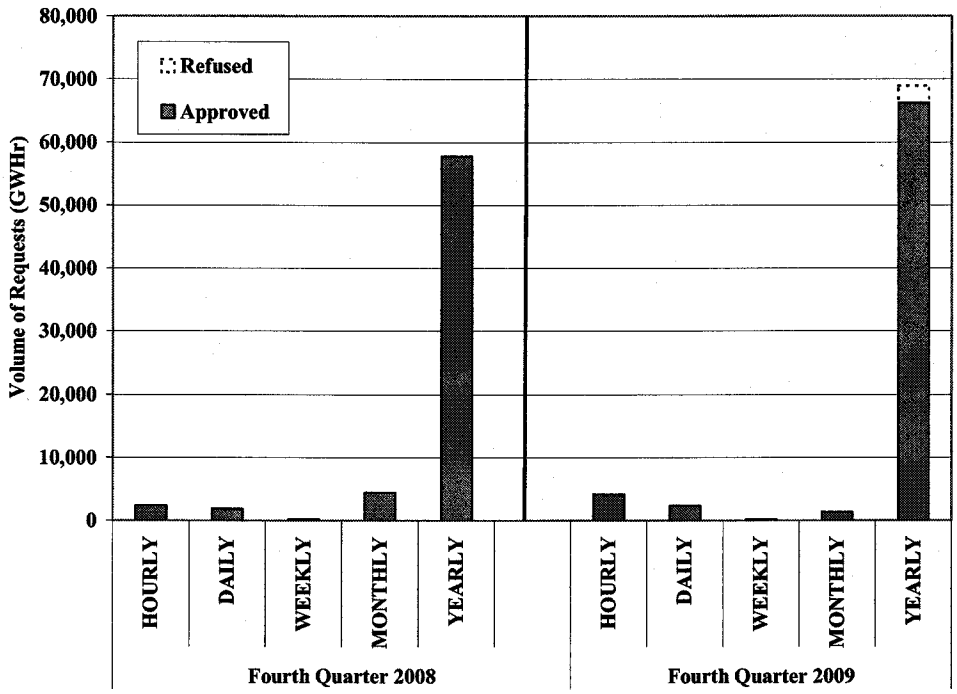


Figure 7 indicates an increase in the volume of approvals for all categories of service except for weekly and monthly. There was an increase in the volume of refused yearly requests, all of which were submitted prior to March 2007. They appear in this figure because the requested service spans the period of study. For these cases in general, the customers did not continue with the application and study process needed to ultimately perform system upgrades to make the transmission available. As a result, our review of the disposition of transmission requests does not raise any anticompetitive concerns.

V. MONITORING FOR ANTICOMPETITIVE CONDUCT

In this section, we evaluate the available market and operating data to identify any evidence of anticompetitive conduct or market manipulation. The market monitoring plan calls for identifying anticompetitive conduct, which includes conduct associated with the operation of either PAC's generation assets or its transmission assets that can create transmission congestion or erect barriers to rival suppliers, thereby raising electricity prices. To identify potential concerns, we analyze PAC's wholesale sales in the first subsection below, its dispatch of generation assets in the second subsection, transmission outages in the third subsection, and PAC's transmission operations in the fourth subsection.

A. Wholesale Sales and Purchases

We examine sales and purchase data to determine whether the prices at which PAC transacted power may raise concerns regarding anticompetitive conduct that would warrant further investigation. We are particularly interested in periods when transmission congestion arises. If PAC were engaging in anticompetitive conduct to create the congestion, it could potentially benefit by making sales at higher prices in constrained areas or purchases at lower prices adjacent to constrained areas. We examined the real-time bilateral transactions made by PAC using PAC internal records. We focus on real-time transactions because they best represent the spot price of electricity.

Competition is facilitated by the ability of rivals to reserve and schedule transmission service. This ability will be limited if ATC is unavailable, transmission requests are refused, or schedules are curtailed. Curtailments are also an indicator of congestion because they can be made when a path is over scheduled. If PAC's ability to curtail schedules is being abused, we would expect to see systematically higher prices for sales or lower prices for purchases coincident with curtailments.

Figure 8 shows the daily average prices received by PAC for real-time bilateral sales and purchases. The figure also indicates days when curtailments occurred that could have potentially benefited PAC's position in the real-time bilateral markets. A curtailment may impact system

flows at market delivery points to the benefit of PAC's net position at those delivery points.[6] The maximum daily effective market position (labeled as "Max Effect" in the figure) is also displayed. This is the impact of PAC's sales and purchase transactions on the congested paths, calculated as the sum of the products of the volume of each market position and the shift factor of the delivery point to the curtailed path. "Max Effect" identifies periods when PAC is actively buying or selling in constrained areas and, therefore, could benefit itself by restricting other suppliers' access. The figure displays this value for the path and hour that has the maximum value for each day.

Figure 8: Prices Received for PAC Sales and Purchases
Fourth Quarter of 2009

The volume weighted average daily sales prices ranged from $ MWh to $ /MWh and the average was $ /MWh. We say a day has a "beneficial curtailment" if PAC is a net seller at a delivery point where the curtailment restricts supply or PAC is a net purchaser where the curtailment increases supply. On days when potentially beneficial curtailments occurred, the

6 The relationship between constrained paths and market delivery points is determined through shift factors, which are the portion of power injected at the market delivery point that flows over the constrained transmission path.

weighted average daily sales prices average $[redacted] MWh. The volume weighted average daily purchases prices ranged from $[redacted] MWh to $[redacted] MWh and the average was $[redacted]/MWh. On days with potentially beneficial curtailments, the weighted average purchase price was $[redacted] MWh. These prices do not show a pattern of PAC benefiting from curtailments.

Though the overall price patterns do not raise concerns, we selected seven days for closer examination. On six of these days, the maximum daily effective market positions were greater than or equal to 80 MW. The seventh day, December 9, 2009, was included due to the price spike on that day shown in Figure 2.

- **November 5, 2009:** The curtailment was on the Northern Utah (NUT) to Path C path. At the time of the high Max Effect, there were several purchases and sales. The transaction that may have benefited from the curtailment[7] was [redacted] This is a low purchase price when compared to the surrounding days.

- **December 3, 2009:** The curtailment was on the PACE to NUT path. At the time of the high Max Effect, there were several purchases and sales. [redacted] These purchase prices are not low for that portion of December.

- **December 7, 2009:** The curtailment was on the PACE to NUT path. At the time of the high Max Effect, there were several purchases and sales. [redacted] This purchase prices is not low for that portion of December.

[7] The other transactions could not benefit from the curtailment because either the delivery points are electrically distant from the curtailed path, or the effects of the curtailment on the transaction would not be to PAC's advantage. An example of the latter would be a purchase position immediately down-stream of the congested path. The curtailment would put upward pressure on the delivery point price by reducing imports into the congested region of the delivery point.

- **December 8, 2009:** The curtailment was on the PACE to NUT path. At the time of the high Max Effect, there were several purchases and sales. [redacted] These purchase prices are not low for that portion of December.

- **December 9, 2009:** The curtailment was on the PACE to NUT path. At the time of the high Max Effect, there were several purchases and sales. [redacted] These prices are not unusual for that portion of December.

- **December 10, 2009:** The curtailment was on the PACE to NUT path. At the time of the high Max Effect, there were several purchases. [redacted] This is a not low purchase price when compared to the surrounding days. .

- **December 25, 2009:** The curtailment was on the PACE to NUT path. At the time of the curtailment, there were sales at multiple points. [redacted] This sales price is not high compared to surrounding days.

Our primary concern is whether PAC anticompetitively created the congestion through generation and transmission operations. Accordingly, we focus particular attention on these days when we evaluate PAC's generation dispatch and transmission outages in the remainder of this section. We also review the accuracy of all curtailments in Section V.D below.

B. Generation Dispatch

To further evaluate whether PAC's conduct raises any anticompetitive concerns, we examine the company's generation dispatch to determine the extent to which congestion may have been the

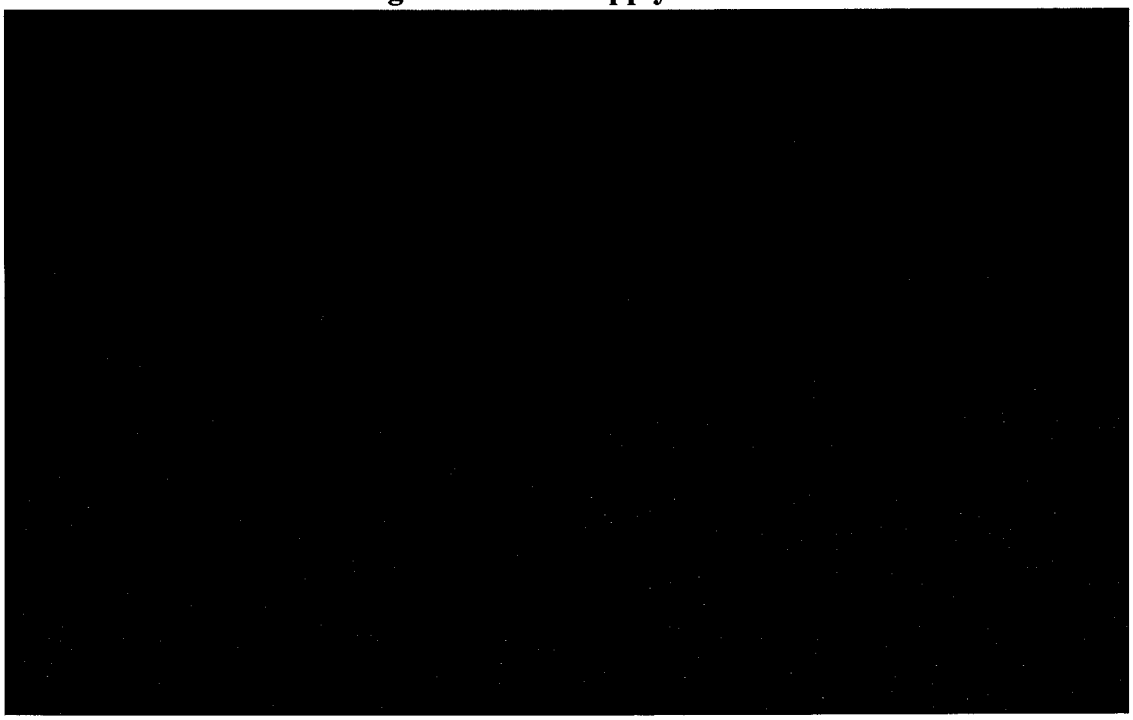
result of uneconomic dispatch of generation by PAC. Therefore, we first examine PAC's dispatch during the study period to determine whether it was consistent with the least-cost use of its resources. Congestion can result naturally when PAC or any utility dispatches its units in a least-cost manner, and does not raise competitive concerns in such circumstances. If a departure from least-cost dispatch ("out-of-merit" dispatch) occurs unjustifiably and it causes congestion, this effect can raise potential competitive concerns. We consider a unit to be out-of-merit when it is dispatched, but could have been replaced by lower-cost generation that was not dispatched.

The PAC system is made up of two control areas: PAC West and PAC East. PAC is the balancing authority for both of these control areas. The movement of power between the two systems is limited by both transmission capability and contractual rights. Efficient merit order dispatch is practical within each control area, but not necessarily between them due to these limits. To account for this, we evaluate out-of-merit dispatch for each control area separately. To identify out-of-merit dispatch, we first estimate each control area's marginal cost curves or "supply curves".[8] We used incremental heat rate curves, fuel costs, and other variable operations and maintenance cost data provided by PAC to estimate marginal costs. This allowed us to calculate marginal costs for PAC's units. We ordered the marginal cost segments for each of the units from lowest cost to highest cost to represent the cost of meeting various levels of demand in a least-cost manner. For our analysis, the curve is re-calculated daily to account for fuel price changes, planned maintenance outages, and planned deratings.

Figure 9 shows the estimated supply curves for a representative day during the time period studied. As the figure shows, the marginal cost of supply increases as more units are required to meet demand, as expected.

[8] We use the term marginal cost loosely in this context. The value we calculate is actually the incremental production cost and does not include opportunity costs, risks, and other factors not reflected in the incremental production cost.

Figure 9: PAC Supply Curves



We used each day's estimated marginal cost curves as the basis for estimating each control area's least-cost dispatch for each hour in the quarter. In general, this will not be the exact level of least-cost dispatch because we do not consider all operating constraints that may require PAC to depart from our estimate of the least-cost dispatch. The analysis is limited to peak hours to avoid times of ramping and commitment issues which prevent achievement of the theoretical least-cost dispatch.

This analysis does not model generator commitments, assuming instead that all available generators are online. While market monitoring resources could have been expended refining the estimated generator commitment and dispatch to make it correspond more closely to actual operating parameters (i.e., start costs , run-time and down-time constraints, etc.), we believe this simplified incremental-operating-cost approach is adequate to detect instances of significant out-of-merit dispatch that would have a material effect on the market.

When a unit with relatively low running costs is justifiably not committed, our least-cost dispatch will overstate the out-of-merit quantities because it will identify the more expensive unit being dispatched in its place as out-of-merit. This may result in higher levels of out-of-merit dispatch during low-load periods when it is not economic to commit certain units.

Other justifiable operating factors that cause the out-of-merit dispatch to be overstated are energy limitations and ancillary services. An example of an energy limitation is a governmental regulation limiting the number of hours a plant may run in a year. Since the unit is physically capable of producing, the limitation does not result in a planned outage or derating. The necessity to limit the hours of plant operation can cause the out-of-merit values to be overstated.

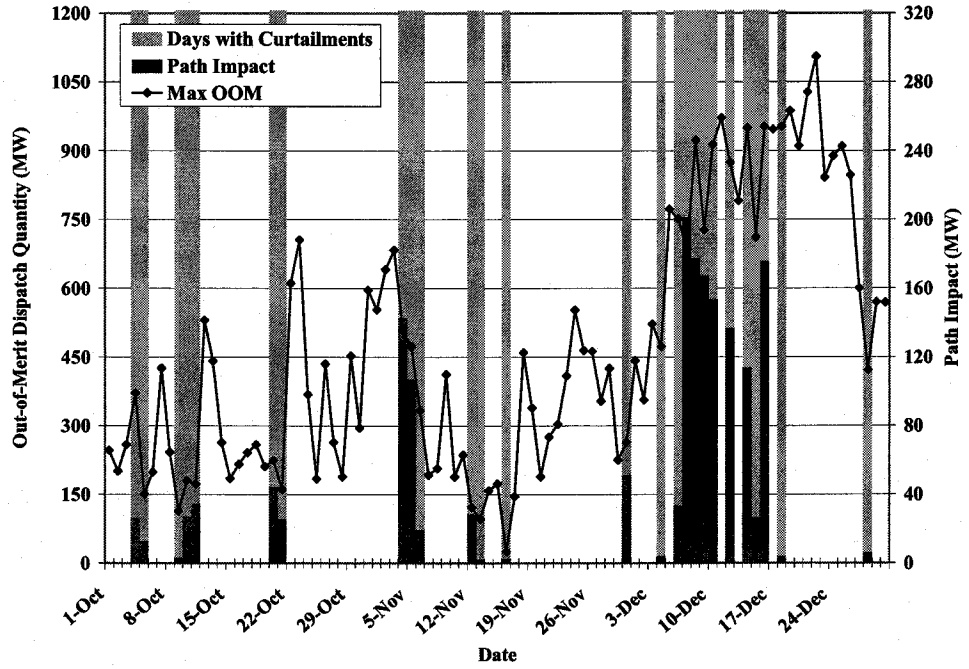
Ancillary services requirements such as spinning reserves, system ramp rate limitations, and AGC control requirements can make it operationally necessary to dispatch a number of units at part load rather than having the least expensive unit fully-loaded. These operational requirements can cause the out-of-merit values to be overstated.

The out-of-merit quantities include units on unplanned outage since a sudden unplanned outage may be an attempt to uneconomically withhold generation from the market. Hence, it will tend to overstate the quantity of generation that is truly out-of-merit. For our analysis, the accuracy of a single point is not as important as the trend and any substantial departures from the typical levels.

Figure 10 and Figure 11 shows the daily maximum "out-of-merit" dispatch for the peak hours of each day in the study period for the Eastern and Western control areas, respectively. Also shown in the figures are days when PAC curtailments were made on paths that were also loaded as a result of out-of-merit dispatch. These days are represented as blue bars. For these days when potential generation-induced curtailments occurred, the out-of-merit dispatch displayed corresponds to the hour when the impact of the out-of-merit dispatch on the congested path was at its daily maximum. The figures also show "Path Impact" (red bars). This is a calculation of the power flow change on the curtailed paths as a result of the out-of-merit dispatch. In other words, if dispatch had been "in-merit", flow on the curtailed path would have been lower by the amount shown. All curtailed paths are tested for impact from generation dispatch from generators in both control areas. The impact of out-of-merit dispatch was determined using generation shift factors.[9]

[9] Generation Shift Factors are defined as the incremental increase or decrease in flow on a flowgate divided by an incremental increase or decrease in a Generation Resource's output.

Figure 10: East Out-of-Merit Dispatch and Congestion Events
Fourth Quarter of 2009



As the analysis of the East control area in the figure shows, there were five days when out-of-merit dispatch was at least 600 MW and contributed at least 150 MW of increased flow over congested paths during the study period. We inquired further into these days in addition to November 5, 2009[10] and found the following:

- *November 5:* [redacted] had a four-day forced outage to repair a [redacted] in [redacted] while the more expensive [redacted] Combined Cycle unit was generating significant amounts of power. At the time of the outage, schedules on the NUT to Path C path were being curtailed. The [redacted] have little impact on this path, but the combined cycle unit replacing the energy adds to the congestion on the path when output is increased (raise-hurt).

- *December 7 through December 9:* [redacted] had a three-day forced outage to repair [redacted] while the more expensive

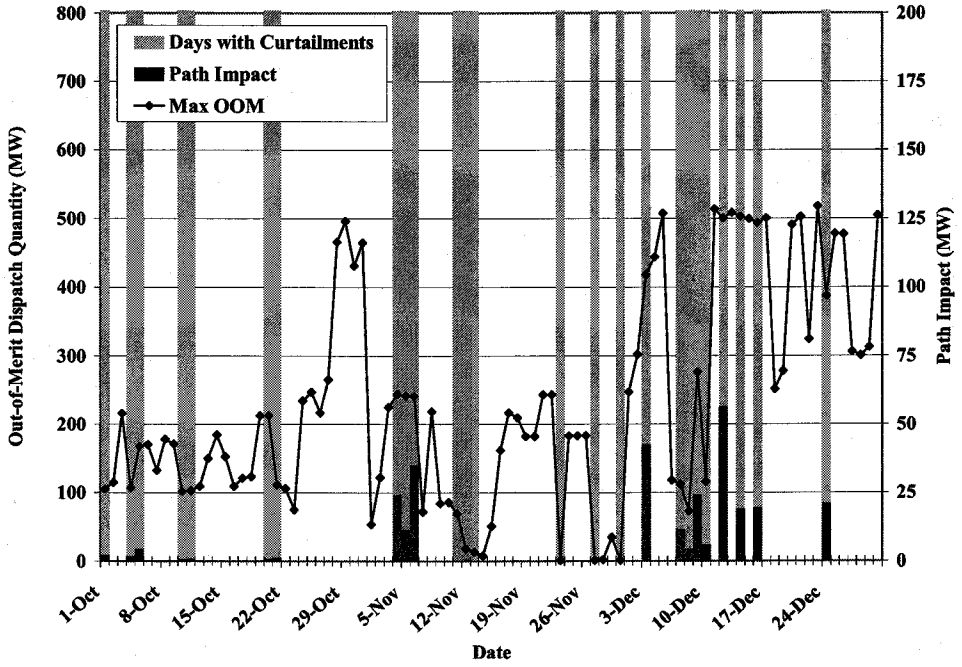
10 November 5, 2009 was added because it was identified as a date of interest in the "Wholesales Sales and Purchases section" and it had 474 MW of out-of-merit dispatch with 107 MW of path impact. The other dates from the "Wholesales Sales and Purchases section" that are otherwise not included had minimal out-of-merit dispatch and path impact.

[redacted] Combined Cycle and [redacted] Combined Cycle units were generating significant amounts of power. At the time of the outage, schedules on the PACE to NUT path were being curtailed. The [redacted] are a strong raise-help (raising output relieves congestion) on this path by providing counter flow. The combined cycle units add to the congestion on the path when their output is increased (raise-hurt).

- *December 10:* [redacted] and [redacted] were at part load while the more expensive [redacted] Combined Cycle and [redacted] Combined Cycle units were generating significant amounts of power. [redacted] was in an unplanned derate due to [redacted] Similarly, [redacted] was in a forced derate due to [redacted]. At the time of the outage, schedules on the PACE to NUT path were being curtailed.

- *December 16:* [redacted] tripped off-line while [redacted]. Once down, it stayed off-line for eight days to [redacted] During this time, the more expensive [redacted] Combined Cycle and [redacted] Combined Cycle units were generating significant amounts of power. At the time of the outage, schedules on the NUT to Path C path were being curtailed.

Figure 11: West Out-of-Merit Dispatch and Congestion Events
Fourth Quarter of 2009



As the West control area figure shows, there were three days when the out-of-merit dispatch was at least 200 MW and contributed at least 35 MW of increased flow over congested paths during the study period. We evaluate these days below and include December 9, 2009 due to the price spike in Figure 2.

- *November 6:* [redacted] was in a one-day forced outage to [redacted] At the time of the outage, schedules on the Wyoming East to Wyoming Central path were being curtailed. [redacted] are a raise-help (raising output relieves congestion) on this path by providing counter flow.

- *December 3:* [redacted] was in a three-day forced outage to [redacted] At the time of the outage, schedules on the PACE to NUT path were being curtailed. The [redacted] are a raise-help on this path by providing counter flow.

- *December 9:* [redacted] was in a three-day forced derating due to [redacted] At the time of the outage, schedules on the PACE to NUT path were being

curtailed. The [redacted] are a raise-help on this path by providing counter flow. The maximum out of merit for this day was 276 MW and the Path Impact was 24 MW.

- *December 12:* [redacted] was in a five-day forced outage to [redacted] Also, [redacted] was in a 37-hour forced outage to [redacted] At the time of the outages, schedules on the PACE to NUT path were being curtailed.

Days identified in the Whole Sales and Purchases analysis above that are not included in the above out-of-merit dispatch analysis were found to not have significant out-of-merit dispatch that affected constrained paths.

Based on our review of the generation outage information in the operating logs, and information garnered from discussions with PAC personnel, we conclude that the aforementioned out-of-merit dispatch from both control areas were justified and did not constitute attempts to engage in anticompetitive behavior.

C. Transmission Outages

We evaluate PAC security events[11] to determine whether PAC's operation of transmission assets may have contributed to the congestion events that occurred during the study period of the report. We also evaluate transmission outages recorded in PAC's "Compass" system, its transmission outage logging system. Between the two systems we found 23 transmission outage events that were associated with schedule curtailments and were planned less than three weeks in advance. This includes six transmission outage associated with curtailments that coincided with the six days when PAC had purchase and sales positions that may have benefited from congestion as presented above. We reviewed these six outages plus one associated with a curtailment deviation identified in the next analysis and found the following:

- [redacted] This eight-hour outage commenced on [redacted]. This outage was taken to [redacted] Curtailments on the Wyoming East to Wyoming North path coincided with this outage.

[11] Security events are defined as transmission security/reliability events that may impact the Provider's ability to schedule transactions.

- [redacted] This four-day outage commenced on [redacted] 2009. This was a construction outage to [redacted] Curtailments on the NUT to Path C path coincided with this outage.
- [redacted] This four-week outage commenced on [redacted] 2009. The outage was taken to [redacted] Curtailments on the NUT to Path C path coincided with this outage.
- [redacted]: This twelve-hour outage commenced on [redacted] 2009. The outage was taken to [redacted] Curtailments on the PACE to NUT path coincided with this outage.
- [redacted]: This 18-day outage commenced on [redacted] This was a construction outage taken to [redacted] Curtailments on the NUT to Path C path coincided with this outage.
- [redacted]: This four-hour outage occurred on [redacted] It was an emergency outage due to [redacted] Curtailments on the NUT to Path C path coincided with this outage. These curtailments appear as justified curtailment deviations in the Transmission Operations section of this report that follows.
- [redacted]: This one-day outage commended on [redacted] 2009. The outage was an emergency action [redacted] The outage forced [redacted] off-line. Curtailments on the Wyoming East to Wyoming North path coincided with this outage.

Through our review of the records and conference calls with PAC staff, we find that all the outages were justified and the events raise no competitive concerns.

D. Transmission Operations

Under PAC operating procedures, path flows can be managed by curtailing transactions scheduled over the path. This can provide the opportunity for anticompetitive conduct by initiating curtailments when they are not necessary. By selectively initiating these procedures, PAC may have the ability to influence power prices in the region to its benefit.

Accordingly, we analyze the transmission schedules to determine whether curtailments are being initiated properly. PAC initiates curtailments when one of four conditions occurs: (1) the path is overscheduled (due to conditions on the transmission system causing a reduction in TTC); (2) a

schedule with a higher priority reservation displaces a schedule with a lower priority reservation; (3) a low voltage constraint is binding, or (4) actual flows exceed the capability of the path.

To be over-scheduled, the net schedules (the sum of firm and non-firm schedules minus the sum of schedules that provide counter-flow) must exceed the TTC (less the scheduled amount of capacity reservations where applicable).[12]

We analyzed the 22 paths where curtailments were initiated by PAC. We compare aggregated ex post net schedules and real-time flows to TTC. Ex post net schedules are the net schedules actually realized at the end of the operating hour. PAC makes the curtailment decision twenty minutes prior to the operating hour. However, NERC standards also allow schedules (referred to as "etags") to be submitted up until twenty minutes prior to the hour. Because it takes ten minutes to evaluate a submitted schedule, the resulting net schedule can change from what it was when PAC initially made the curtailment decision. There may also be emergency etags submitted later than twenty minutes prior to the hour. Yet, this ex ante data is not available. Thus, utilizing ex post data provides only an approximation.

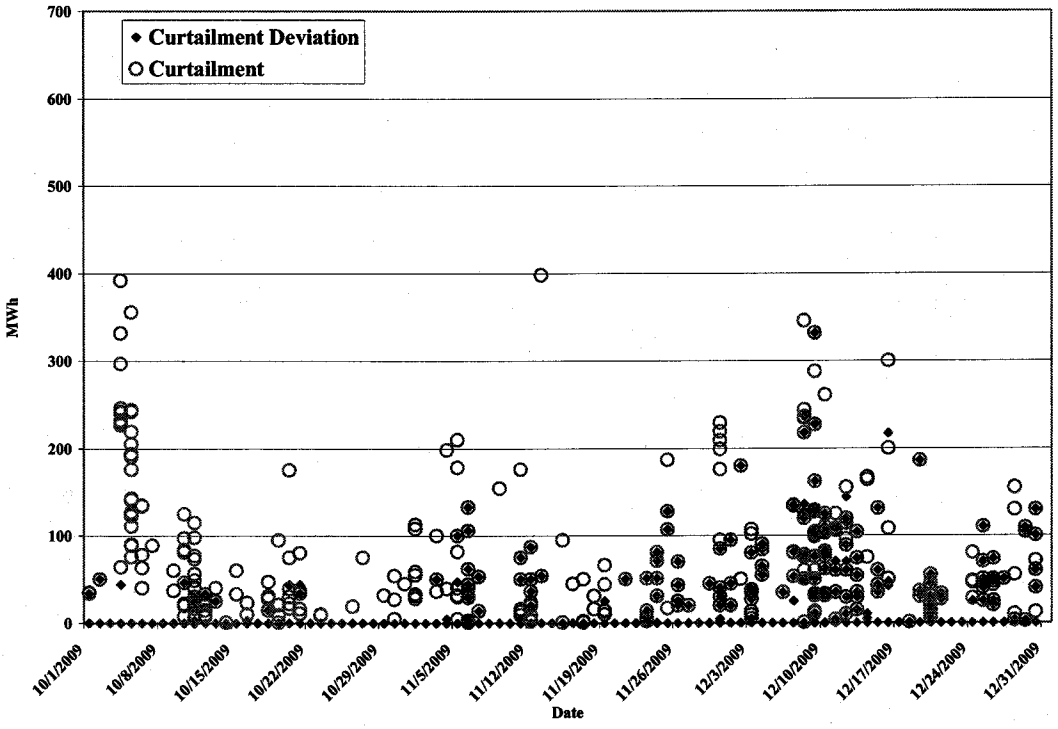
The curtailment deviations calculated and reported in the analysis below equal the TTC value minus the aggregated ex-post net schedules, except for the "Northern Utah (NUT) to Path C" path. On the "NUT to Path C", loop-flow is significant, so we calculate these curtailment deviations as the TTC value minus the maximum of either the real-time flows or the aggregated ex-post net schedules. Using real-time flow allows us to capture the loop-flow on this path. The curtailment deviations are limited to a ceiling equal to the curtailment amount and a floor of zero, since we are less concerned with under curtailments. In the absence of emergency tags or tags otherwise submitted after PAC makes its curtailment decision, if a path is over-scheduled and the curtailments are accurate, this value should be close to zero.[13] Figure 12 shows the results of this analysis.

---

12 Effective April 28, 2008, PAC utilizes forecasted values for Path C capacity when making its curtailment decisions. Accordingly, when evaluating curtailments on the path "PACE to Path C", we utilize the forecasted capacity value rather than TTC.

13 The other reasons for curtailments aside from the path being over scheduled will not necessarily result in a curtailment deviation close to zero.

Figure 12: Curtailment and Curtailment Deviation
Fourth Quarter of 2009



Over the quarter, 481 curtailments were implemented. Of these, 57 curtailments had at least a 75 MW deviation. We reviewed all 57 for accuracy.

Twenty-six of the curtailments were of schedules between [redacted] Further review finds that all 26 curtailments are justified by physical flows exceeding schedules and reaching the path limits.

Two of the curtailments were of schedules on the [redacted] on November 6, 2009. This was caused by a set-up error that was identified and corrected that same day. When PAC made modifications to their active points of receipt and points of delivery, the software had to be set-up to recognize the schedules so that the schedules that load the paths could be identified and curtailed if the path limits were reached. Set-up errors can cause unrelated schedules to be included or related schedules to be excluded.

Twenty-eight of the curtailments were of schedules on the [redacted] Eighteen of these are justified by physical flows exceeding schedules and reaching the path limits. The remaining ten curtailment deviations on this path occurred from December 8 through December 10, 2009,

and were caused by a set-up error that occurred on December 3, 2009. This was corrected on December 11, 2009.

One curtailment deviation was on the [redacted] on December 16, 2009. This curtailment was needed and justified because of an emergency outage on the [redacted]. This outage is discussed on the Transmission Outages section above.

Of the 57 curtailments that we reviewed, twelve were found to be inaccurate or unjustified. All twelve were related to setting up software. PAC had made modifications to their active points of receipt and points of delivery. There is room for improvement in the process of implementing these types of changes, but we do not view these events as evidence of anticompetitive conduct. Other than these software issues, we find that actions taken to manage the system were appropriate.

E. Conclusions on Monitoring for Anticompetitive Conduct

Based on our analysis of PAC's conduct and the market outcomes, we find no conduct by PAC that raises potential competitive concerns during the period of study.